

CLAIMS

What is claimed is:

- 1 1. A tolerance ring, comprising:
 - 2 a substantially cylindrical base portion having a first
 - 3 radius;
 - 4 a plurality of contacting portions, each having at least
 - 5 one central region that reaches a second radius, at least two
 - 6 circumferential transition regions each being circumferentially
 - 7 adjacent to the central region and spanning from said first
 - 8 radius substantially to said second radius over a
 - 9 circumferential transition length, and at least two axial
 - 10 transition regions each being axially adjacent to the central
 - 11 region and spanning from said first radius substantially to said
 - 12 second radius over an axial transition length, said axial
 - 13 transition length being greater than said circumferential
 - 14 transition length.

1 2. The tolerance ring of claim 1, having a material
2 thickness and wherein said axial transition regions have a
3 profile including at least one curve with a radius of curvature
4 of at least 2.5 times said material thickness.

1 3. The tolerance ring of claim 1, wherein said contacting
2 portions each have an overall axial length and an overall
3 circumferential width, and the ratio of said axial transition
4 length to said overall axial length is more than the ratio of
5 said circumferential transition length to said overall
6 circumferential width, but less than 250 times the ratio of said
7 circumferential transition length to said overall
8 circumferential width.

1 4. The tolerance ring of claim 1, wherein said contacting
2 portions each have an overall circumferential width, and the
3 ratio of said circumferential transition length to said overall
4 circumferential width is less than or equal to 0.4.

1 5. An actuator arm assembly for an information storage
2 device, comprising:
3 an actuator arm; and
4 an actuator pivot bearing; and

5 a tolerance ring retaining the actuator pivot bearing
6 relative to the actuator arm, wherein the tolerance ring
7 comprises;

8 a substantially cylindrical base portion having a first
9 radius; and

10 a plurality of contacting portions, each having at least
11 one central region that reaches a second radius, at least two
12 circumferential transition regions each being circumferentially
13 adjacent to the central region and spanning from said first
14 radius substantially to said second radius over a
15 circumferential transition length, and at least two axial
16 transition regions each being axially adjacent to the central
17 region and spanning from said first radius substantially to said
18 second radius over an axial transition length, said axial
19 transition length being greater than said circumferential
20 transition length.

1 6. The actuator arm assembly of claim 5, wherein said
2 contacting portions each have an overall axial length and an
3 overall circumferential width, and the ratio of said axial
4 transition length to said overall axial length is more than the
5 ratio of said circumferential transition length to said overall
6 circumferential width, but less than 250 times the ratio of said

7 circumferential transition length to said overall
8 circumferential width.

1 7. The actuator arm assembly of claim 5, wherein said
2 contacting portions each have an overall circumferential width,
3 and the ratio of said circumferential transition length to said
4 overall circumferential width is less than or equal to 0.4.

1 8. The actuator arm assembly of claim 5, wherein said
2 tolerance ring has a material thickness and wherein said axial
3 transition regions have a profile including at least one curve
4 with a radius of curvature of at least 2.5 times said material
5 thickness.

1 9. A method of fabricating a tolerance ring, comprising:
2 forming a plurality of contacting portions in metal strip,
3 each having at least one central region that is offset from the
4 plane of the metal strip, and at least two first transition
5 regions each being adjacent to the central region along a first
6 axis and each spanning said offset over a first transition
7 length measured along said first axis, and at least two second
8 transition regions each being adjacent to the central region
9 along a second axis and each spanning said offset over a second
10 transition length measured along said second axis, said second
11 transition length being greater than said first transition

12 length and said second axis being substantially orthogonal to
13 said first axis; and
14 bending said metal strip into a substantially cylindrical
15 shape, so that said second axis is substantially parallel to the
16 central axis of the cylindrical shape.

1 10. The method of claim 9, wherein said bending comprises
2 rolling.

1 11. The method of claim 9, wherein said bending comprises
2 wrapping.

1 12. A method of assembling an actuator arm assembly for an
2 information storage device, comprising:
3 forming a plurality of contacting portions in metal strip,
4 each having at least one central region that is offset from the
5 plane of the metal strip, and at least two first transition
6 regions each being adjacent to the central region along a first
7 axis and each spanning said offset over a first transition
8 length measured along said first axis, and at least two second
9 transition regions each being adjacent to the central region
10 along a second axis and each spanning said offset over a second
11 transition length measured along said second axis, said second
12 transition length being greater than said first transition

13 length and said second axis being substantially orthogonal to
14 said first axis; and
15 bending said metal strip into a substantially cylindrical
16 shape, so that said second axis is substantially parallel to the
17 central axis of the cylindrical shape; and
18 sliding a bearing cartridge into said substantially
19 cylindrical shape; and then
20 inserting said bearing cartridge together with said
21 substantially cylindrical shape into a hole in an actuator arm.

1 13. The method of claim 12, wherein said bending is
2 oriented to bring said central region to an outer radius of said
3 cylindrical shape.

1 14. A method of assembling an actuator arm assembly for an
2 information storage device, comprising:
3 forming a plurality of contacting portions in metal strip,
4 each having at least one central region that is offset from the
5 plane of the metal strip, and at least two first transition
6 regions each being adjacent to the central region along a first
7 axis and each spanning said offset over a first transition
8 length measured along said first axis, and at least two second
9 transition regions each being adjacent to the central region
10 along a second axis and each spanning said offset over a second

11 transition length measured along said second axis, said second
12 transition length being greater than said first transition
13 length and said second axis being substantially orthogonal to
14 said first axis; and

15 bending said metal strip into a substantially cylindrical
16 shape, so that said second axis is substantially parallel to the
17 central axis of the cylindrical shape; and

18 sliding said substantially cylindrical shape into a hole in
19 an actuator arm; and then

20 inserting a bearing cartridge into said substantially
21 cylindrical shape.

1 15. The method of claim 14, wherein said bending is
2 oriented to bring said central region to an inner radius of said
3 cylindrical shape.